
5. Calibration and Balancing

There are calibration and offset adjustment controls for most of the analog elements in the 4618B. Normally, no adjustment of these elements is anticipated for the life of the instrument. However, all or part of the calibration and balancing procedures may be indicated if any of the following conditions exist:

- A torque difference between CW and CCW full scale readings of greater than 2 least significant digits - in standard resolution.
- Inability to zero the Torque reading with the ZERO control located on the back panel of the dynamometer.

There is no calibration for the digital speed reading accuracy. Please refer to MODEL 4618B SPECIFICATIONS in this chapter.

PROCEDURE

Routine Torque calibration and zero offset adjustments should always be done on the Dynamometer. The torque signal offset and calibration controls within the 4618B are there to permit standardization to precise and known value inputs.

Warning!

The following requires removal of the 4618B top cover. All connections and trimpot adjustments must be made only as specified herein and with *caution*. There is an **electrical shock hazard** inside the 4618B.

All calibration and balancing potentiometers are contained on the circuit board identified TSC-1, located in the upper right corner of the 4618B chassis, facing from the front. The sketch shows that portion of the board where the trimpots are located and their identification.

TORQUE ZERO ADJUSTMENT

1. Remove any couplings from the dynamometer shaft.
2. Place a precision voltmeter resolving at least .1 millivolt (D.C.) between pins 13 and 14 on the DYNAMOMETER ribbon connector, pin 13 negative. You may have to remove the connector cap on the cable, or obtain access from inside the dynamometer rear panel.
3. Adjust the dynamometer zero control for best zero (dynamometer torque signal output) on your voltmeter.

The object of the following steps is to alternate between the - and + **Q Bal** trimpots, until you know that each is adjusted such that your output torque reading is *just* at zero - *on both* trimpots.

While observing the 4618B Output Torque Reading:

1. Adjust the +**Q Bal** trimpot slowly - try both CW and CCW rotation until the indicated torque value reads slightly higher, then back off very slowly until the reading is zero, *or* returns to the original value. Repeat this procedure on the -**Q Bal** trimpot - work back and forth and set zero with a 1 flashing occasionally.

FULL SCALE TORQUE CALIBRATION

1. Complete the zero adjustment procedure outlined in the preceding paragraph. Install the Dynamometer Torque Calibration beam, as shown in the sketch on the next page.
2. Rotate the TORQUE control on your power supply, full CW for maximum applied torque. With a precision weight, apply a known torque at - or close to full scale - in the CCW direction. Maintain the beam exactly horizontal and perfectly still.
3. Observe the voltage reading on the voltmeter (Across Pins 13 and 14). Adjust the TORQUE CALIB, on the rear panel of the dynamometer, for a *voltmeter* (millivolt reading) exactly equal to the true torque applied.
4. Adjust the - **Q Cal** trimpot until the 4618B torque reading is equal to the voltmeter reading and the true torque applied.
5. Place the weight on the opposite side of the beam, adjust the +**Q Cal** trimpot to match the 4618B Torque reading to the true torque applied.

ACCESSORY TORQUE OUTPUT CALIBRATION

With zero torque on the dynamometer - nothing connected to the shaft:

1. While reading the 4618B Torque Value, adjust the Dynamometer ZERO Control for best zero reading.
2. With a voltmeter resolving at least .1 millivolt D.C., connected between pins 2 and 4 on the ACCESSORY TORQUE-SPEED OUTPUT connector, adjust trimpot **Qo Bal** for best zero reading.
3. Attach a Calibration beam, energize the brake to hold the beam, attach a weight to apply an amount of torque close to the dynamometer full scale rated value. Adjust **Qo Cal** for the correct torque reading on the voltmeter.

MODEL 4618B SPECIFICATIONS

Speed Accuracy: 0.05% of the SPEED reading, ± 1.0 RPM.

Torque: Basic torque accuracy is controlled by the Dynamometer ZERO and CALIBRATION controls, by the level of care and frequency of adjustment. The Torque conversion elements within the 4618B contribute no more than a temperature related drift of up to $\pm .005\%/^{\circ}\text{C}$ of ambient change, of reading .

Please refer to your Magtrol Dynamometer User's manual for additional information on Torque accuracy.



Testing, Measurement and Control of Torque-Speed-Power • Load-Force-Weight • Tension • Displacement

www.magtrol.com

MAGTROL INC

70 Gardenville Parkway
Buffalo, New York 14224 USA
Phone: +1 716 668 5555
Fax: +1 716 668 8705
E-mail: magtrol@magtrol.com

MAGTROL SA

Route de Moncor 4B
1701 Fribourg, Switzerland
Phone: +41 (0)26 407 3000
Fax: +41 (0)26 407 3001
E-mail: magtrol@magtrol.ch

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